FIRST SEMI-ANNUAL 2002 REMEDIAL ACTION

NATIONAL ELECTRIC COIL SUPERFUND SITE
HARLAN COUNTY, KENTUCKY

Prepared for:
COOPER INDUSTRIES
HOUSTON, TEXAS

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CEC Project 200658

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1.0 INTRODUCTION

1.1 SITE LOCATION

The National Electric Coil (NEC) facility is situated on approximately four acres of land and is located in Dayhoit, Harlan County, Kentucky, shown on Figure 1. The facility is bordered on the west by former U.S 119, on the east by the Cumberland River, on the north by an emergency utility substation, and on the south by a trailer park property. The facility is surrounded by a chain-link fence, and is occupied by a main plant building, several smaller storage buildings, and a boiler house, shown on Figure 2. Figure 3 shows the site vicinity, including the offsite properties and the location of the Cumberland River that flows generally east to west.

1.2 SITE HISTORY

The facility was originally opened in 1951 by the McGraw-Edison Company (McGraw-Edison) and operated as a rebuilding and remanufacturing facility for coal mining and related industrial equipment including electric motors, rewinding electric coils, manufacturing, general machine shop work, and mining equipment repair. McGraw-Edison owned and operated the facility until 1985 when Cooper Industries (Cooper) purchased McGraw-Edison as a wholly-owned subsidiary. McGraw-Edison continued to operate the NEC facility until August 1987. The Treen Land Company of Brookside, Kentucky purchased the NEC building and property in August of 1987 and the operations were reopened as the National Electric Service Company. The facility operates under the National Electric Services Management Group, owned by Charles Dozier, for electrical motor repair work and limited rebuilding of hydraulic systems for the coal industry.

1.3 SITE ENVIRONMENTAL ACTIONS

In October 1990, the United States Environmental Protection Agency (USEPA) issued a Unilateral Administrative Order (UAO) (USEPA Docket No. 90-57-C) requiring immediate actions designed to mitigate the release of hazardous substances from the site. Cooper subsequently contracted with Law Engineering & Environmental Services (Law) to develop and implement a Remedial Action Plan (RAP) in accordance with the USEPA's UAO. As part of the RAP, Law installed monitoring wells at the site to evaluate the magnitude of the groundwater contamination.

The NEC site was proposed for inclusion on the National Priority List (NPL) on July 29, 1991 and the site was placed on the NPL on October 14, 1992. USEPA and Cooper entered into an Administrative Order by Consent for a Remedial Investigation/Feasibility Study (RI/FS) in May 1992. The USEPA issued a UAO on December 15, 1992, directing Cooper to perform the Interim Remedial Design/ Interim Remedial Action (RA), described in the Record of Decision (ROD), concurrently with the RI/FS to capture groundwater containing chlorinated volatile organic compounds (VOCs).

The original remedial action involving the groundwater recovery and treatment system was initiated in July 1993 and consisted of an onsite Recovery Well CMW-5-11 located in the deeper bedrock aquifer zone (at an approximate depth of 120 feet), an equalization tank, an air stripping tower, and a 10,000 pound activated carbon unit to treat the air stripper off-gas.

An additional RA was implemented at the site to address impacted groundwater in accordance with the April 26, 1996 ROD and the May 20, 1996 UAO issued to

Cooper by the USEPA. A RA Report (March 4, 1998) was submitted to document the implementation and initial start-up activities associated with the RA system. The supplemental RA system consisted of the installation of additional groundwater recovery systems located in the shallow alluvial aquifer and the intermediate and deeper zones of the underlying bedrock aquifer, and the continued use of the treatment system to remove the VOCs from the extracted groundwater using air stripping technology. The air stripper off-gases are treated through a catalytic oxidation system (instead of activated carbon) prior to being discharged into the atmosphere via a 60-foot tall air stack.

The final groundwater recovery system consisted of the installation of four recovery units: an interceptor trench located in the shallow alluvial aquifer (approximately 190 feet long and 24 feet deep); Recovery Well R-2 located in the intermediate bedrock aquifer zone (approximately 80 feet deep); Recovery Well CMW-5-2A located in the deeper bedrock aquifer zone (approximately 125 feet deep); and existing Recovery Well CMW-5-11 (approximately 120 feet deep) located in the deeper bedrock aquifer zone.

The final groundwater treatment system consisted of a 2,000-gallon double-walled equalization tank, the existing air stripper tower, and a catalytic oxidation system to treat the off-gases from the air stripping tower, in accordance with the EPA approved air emission performance standards. Treated water from the air stripper continues to be discharged to the Cumberland River in compliance with the requirements of a KPDES permit. The layout of the remediation system is shown on Figure 2.

The supplemental RA implementation activities were conducted between September 1997 and February 1998. The final groundwater recovery systems and the catalytic oxidation unit started up in February 1998.

1.4 CONTAMINANTS OF CONCERN

Historically, several VOCs have been detected in the groundwater samples collected from the site, however the contaminants with the highest concentrations detected include trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride, and 1,1-DCE. The contaminants of concern and their respective maximum contaminant levels (MCLs) are listed below:

Contaminant	MCL (ug/l)
TCE	5
Cis-1,2-DCE	70
Trans-1,2-DCE	100
Vinyl Chloride	2
1,1-DCE	7

2.0 SEMIANNUAL ACTIVITIES

2.1 SYSTEM OPERATION AND MAINTENANCE

Civil & Environmental Consultants, Inc. (CEC) and Eastern Well and Pump conducted routine monthly monitoring of the groundwater remediation system. The operations and maintenance of the groundwater remediation system are performed by Eastern Well & Pump. Table 1 summarizes the maintenance conducted from January through June 2002. The system was shut down for three days in March due to severe flooding in the area, and was restarted on March 20, 2002. The system was also shutdown on May 8, 2002 for routine maintenance, cleaning and servicing of the air stripper. Maintenance activities included repairs to instrumentation, electrical repairs, disinfecting the recovery wells with bleach, winterization of the equipment, and routine maintenance of the equipment and pumps. Overall, no major problems were encountered during the period.

2.2 INFLUENT AND EFFLUENT WATER SAMPLING

Operation of the remediation system is subject to federal and state requirements. The KYDEP Water Resources Branch, Division of Water, in a letter dated March 6, 1996, set forth the requirements for the NEC site for groundwater withdrawal and pumping from the three aquifer zones. The authorization letter permits total recovery rates to a maximum of 250 gpm (0.360 mgd) from all of the aquifer zones. The groundwater recovery system was pumped at a rate between 153 to 191 gpm, with an average of 174 gpm for the reporting period.

Monitoring of the discharged groundwater has continued during the operation of the Remedial Action (RA) to demonstrate continued compliance with the KPDES requirements. A KPDES permit (No. KY0093149) was granted for the discharge of water from the treatment system and is effective from February 1, 1997 through February 1, 2002. A modified permit was issued by the KYDEP on December 20, 1999, which became effective on February 1, 2000. The modified permit allowed for monthly monitoring of the effluent water, eliminated the need for PCB analysis, and eliminated the need for the diffuser pipe. This permit, which was effective through the first two months of this reporting period, established discharge limitations and monitoring and reporting requirements (Table 2).

Cooper submitted a new NPDES application to the KYDEP on July 30, 2001, and the permit was approved on December 21, 2001. The new permit is effective from April 1, 2002 through July 31, 2003. The permit duration is abbreviated to allow KYDEP to synchronize this facility with other permit grantees in the watershed. The permitted groundwater withdrawal rate of 250 gpm is unchanged; however, the daily maximum system discharge limits have been removed. Metals limits for the effluent have been removed and quarterly monitoring is only required for total recoverable zinc and copper. All volatile organic compound (VOC) effluent limitations remain unchanged. A revised table of effluent limitations is presented in Table 2 and was in effect for the last three months of this reporting period.

Effluent water samples were collected monthly during the reporting period to monitor the treatment efficiency of the air stripper. In addition, three influent samples were collected during this period to monitor the effectiveness of the remediation system and to estimate the amount of contaminants removed. Samples were analyzed for VOCs by PACE (formerly Antech Ltd.) using USEPA Method 8260.

2.3 INFLUENT AND EFFLUENT AIR EMISSION SAMPLING

The KYDEP has not established limits for air emissions from the treatment system and does not require an air permit. However, the USEPA has developed emission rates and ambient air performance standards for the RA system as follows:

Cis-1,2-DCE	5,850,000 ppbv
TCE	19,600 ppbv
Vinyl Chloride	837 ppbv

Performance standards were established in the ROD, with limitations on the discharge of TCE, cis-1,2-DCE, and vinyl chloride. The point of compliance for the emission rate standards is the discharge end of the 60-foot air exhaust stack, after the catalytic oxidation unit.

The air emissions exiting the air exhaust stack were monitored during the initial start up of the RA off-gas system to demonstrate compliance of the catalytic oxidation treatment system with the USEPA emission rate performance standards. Monitoring of the air exhaust emissions exiting the stack has continued on a monthly basis during the operation of the RA to demonstrate continued compliance with USEPA's air emission performance standards.

The off-gas catalytic oxidation system operated during the operation of the stripper system. Both influent air and effluent air were sampled each month during the period, except for April, when an effluent sample was collected. Samples were collected in Summa canisters with flow-control valves and analyzed by Severn Trent in Houston, Texas, for VOCs using USEPA Method TO-14.

2.4 GROUNDWATER SAMPLING

Cooper conducts routine groundwater monitoring on a semiannual basis. The purpose is to evaluate the concentrations of VOCs in groundwater with respect to time, and to measure the effectiveness of the groundwater recovery and treatment system. The groundwater monitoring system for the NEC site is summarized in Table 3.

The second semiannual sampling event was conducted on April 30 and May 1, 2002 by CEC. Activities included water level measurement in 23 monitoring wells, as well as an onsite sump, and the collection of 13 groundwater samples. Groundwater monitoring well locations are shown on Figure 4.

Conventional groundwater sampling procedures and protocols were used in conducting the monitoring. Groundwater levels were measured within each monitoring well to determine groundwater elevations for the development of groundwater elevation contour maps, and to identify groundwater flow directions.

Prior to sampling of each monitoring well, a minimum of three well volumes of water were removed from the wells (unless the wells are recovery wells used for pumping groundwater), and disposed through the facility treatment system. Samples for laboratory analysis were collected in laboratory-prepared VOA vials containing an appropriate amount of preservative. Vials were filled without headspace or air bubbles. Samples were packaged in shuttles containing ice packs for shipment to the analytical laboratory. Chain-of-custody protocol was adhered to during all phases of sample collection, transportation and delivery to the laboratory. Pace Analytical (formerly Antech Ltd.) of Export, Pennsylvania, analyzed the groundwater samples.

During the sampling event, four QA samples were collected. QA samples included a trip blank, an equipment blank, a duplicate sample from CMW-7 (labeled as "Duplicate") and a field blank. The trip blank was prepared by the analytical laboratory prior to shipping the sample bottles, and accompanied the sample bottles throughout the entire sampling process. The equipment blank was collected by pouring deionized water over sampling equipment after it had been decontaminated, and was collected to evaluate the effectiveness of the decontamination procedures. The duplicate sample was collected to evaluate laboratory analytical procedures. The field blank was collected to evaluate the ambient air conditions at the time of sampling.

3.0 FINDINGS

3.1 SYSTEM PERFORMANCE

The recovery system treated and discharged over 45 million gallons of water during this reporting period (Table 4 and Appendix A). The average flow rates for the recovery system during the reporting period were approximately:

Shallow aquifer (interceptor trench)	1.4 gpm
Intermediate bedrock aquifer (R-2)	15 gpm
Deep bedrock aquifer (CMW-5-2A, CMW-5-11)	158 gpm

These flows were determined by totalizing flow meters at the treatment plant. Based on these measurements, the average total pumping rate of the system was approximately 174 gpm, which is below the KPDES permit limit of 250 gpm.

The LawGibb Group (Law) evaluated the influent and effluent air samples from the cat-ox system in October 2001.

The remediation system was down for three days in March due to flooding in the area, and in May for routine maintenance and cleaning. Table 1 summarizes the system maintenance activities during this six-month period.

3.1.1 Influent Concentrations

Table 4 summarizes the analyses of untreated influent water for the first half of 2002. Concentrations presented for January, February, and May 2002 were estimates for calculation purposes based on actual data from the nearest previous month. Influent samples were collected in March, April, and June 2002. The analytical results are presented in Appendix B. The cis-1,2-DCE ranged from 360 ppb in March to 440 ppb in April and June. TCE values fluctuated from a low of 26 ug/l in June and a high of 87 ug/l in April. Vinyl chloride concentrations fluctuated from a low of 21 ug/l in March and a high of 29 ug/l in June (Figure 9).

Contaminant concentration levels in the air stripper influent water through time are summarized on Figure 5. Influent water quality for the treatment system has exhibited an overall decreasing trend since the final remediation system was started up in February 1998; however, concentrations reached a two-year high in August 2001 due to increased pumping at recovery well 5-11 and low precipitation in this area.

3.1.2 Effluent Quality

System effluent water concentrations for the reporting period are also summarized in Table 4. All measurements of cis-1,2-DCE, TCE, and vinyl chloride complied with the KPDES permit effluent limits for the daily maximum. Furthermore, monthly average concentrations complied with the monthly average limit specified in the permit. The average removal efficiency for the air stripper was 93% (Table 4).

3.1.3 Contaminant Removal

Table 4 indicates that approximately 194 pounds of VOCs were removed from the groundwater system during the first half of 2002. This total includes approximately 147 pounds of cis-1,2-DCE, 37 pounds of TCE, and 10 pounds of vinyl chloride. Since January 1997, approximately 2,146 pounds of VOCs have been removed

(Appendix A). Since startup of the system in July 1993, approximately 3,796 pounds of VOCs have been removed from the aquifer.

3.1.4 Off-Gas Treatment

Table 5 summarizes analyses of the air stripper exhaust gas (cat-ox influent) and the cat-ox air stack effluent for the reporting period and the analytical report is presented in Appendix B. Concentrations in both the influent and stack effluent samples were well below the standards established by EPA in the ROD. Cooper has retained Law to evaluate the cat-ox system at the site. Law issued a report in October 2001 presenting its findings. CEC updated some of the tables and figures to include late 2001 and 2002 data. The updated summary of historic cat-ox influent concentrations is presented in Table C-1 (Appendix C). Revised graphs presenting the cat-ox influent concentrations for 1,2-DCE (Figure D-1), TCE (Figure D-2) and VC (Figure D-3) are presented in Appendix D. As shown on the tables and graphs, the influent concentrations of these VOCs have been consistently significantly below the effluent standards.

For this reporting period, Cooper used the maximum cat-ox system influent concentration for each compound analyzed during the first half of 2002 in determining the percentage of air emission with respect to the standard. For cis-1,2-DCE, TCE, and vinyl chloride, the maximum concentrations were measured in December. The 3,980 ppbv value for cis-1,2-DCE equates to 0.07 percent of the 5,850,000 ppbv standard. The 266 ppbv value for TCE represents 1.36 percent of the 19,600 ppbv standard and the 219 ppbv value for vinyl chloride equates to 26.2 percent of the 837 ppbv standard. Because the untreated air emissions from the air stripper continue to meet the required emission standards and are less than 27% of the EPA air emission limits, Cooper believes operation of the cat-ox unit should be discontinued.

3.1.5 Regulatory Review

The Commonwealth of Kentucky repealed its toxic substances emission standards on January 19, 1999 and adopted the federal hazardous air pollutant regulations. However, 401 KAR 63:021 Section 1 states, "A source in existence on the effective date of this administrative regulation which was issued a permit pursuant to 401 KAR 50:035 with conditions based on this administrative regulation or 401 KAR 63:022 shall continue to comply with all conditions based on this administrative regulation or 401 KAR 63:022 unless it can demonstrate that a condition is no longer necessary to protect human health and the environment."

Although Cooper was not issued a permit for operating the air stripper as part of the remedial action for this Superfund site, Kentucky's air toxic regulations were considered ARARs. To demonstrate compliance with these former regulations, a table has been prepared utilizing the maximum concentrations of target compounds measured during the year from the air stripper exhaust gas. These concentrations and volumes of chemicals were compared to Kentucky's Threshold Ambient Limits (TALs) and Significant Emission Levels without adjustment for height of emissions release. The maximum air stripper emission concentrations were less than Kentucky's TALs by 16 and 78 percent and less than the Significant Emission Levels by 70 and 92 percent for cis-1,2-dichloroethene and trichloroethene, respectively. Even under these extremely conservative computations, the emission levels are substantially below the regulated levels contained in Kentucky's former air toxic regulations and would only emit 584 pounds per year of total VOCs, including vinyl chloride (49 pounds per month, or less than 1.6 pounds per day), Kentucky's total allowable VOC emissions would be 10 tons per year, 20,000 pounds per year, 1,667 pounds per month or less than 55 pounds per day. This substantiates the fact that the cat-ox unit is not required to meet Kentucky air emission standards.

The Kentucky Administrative Code (401 KAR 52:070) establishes criteria for registration of designated air contamination sources. These regulations apply to sources that emit or have the potential to emit (PTE) 2-tons per year or more but less than 10 tons per year of a HAP.

Additionally, the Kentucky Division for Air Quality establishes criteria for designation of insignificant activities as the potential to emit 1,000 pounds of combined HAPs per year, or 5 tons per year of any nonhazardous regulated air pollutant.

Based on the data provided in the appendix and the analyses of off-gas VOC discharge from the air stripper, the emissions of HAPs and total VOCs are below the criteria for registration as a designated source.

3.2 GROUNDWATER FLOW

Groundwater level measurements were obtained from 23 monitoring wells, plus the onsite sump, during this semiannual monitoring event (Table 6).

The groundwater elevations were used to generate groundwater contour maps of the shallow, intermediate and deep aquifers. Groundwater flow in the shallow aquifer shows the effects of the recovery trench (Figure 6) with the trench capturing groundwater in the central portion of the facility.

Data for the intermediate aquifer during this reporting period are presented on Figure 7. Dashed contours are included where groundwater elevations are inferred based on historic data from previous pumping tests that have demonstrated that a capture zone has been developed around intermediate pumping well R-2. The water level for R-2 was elevated during the site visit. CEC field personnel determined that the pump was not working due to a tripped breaker. The breaker was reset and the pump resumed operation. The water elevation in R-2 was not used in the generation of the contour map. However, representatives from Eastern Well and Pump collected water levels in early September to confirm that the system was operated properly. The new water levels are presented in Figure 7, but were not used in the development of the map.

Data for the deep aquifer (Figure 8) indicates the presence of an elongated cone of depression surrounding the deep pumping wells, CMW-5-2A and CMW-5-11, and extending toward wells CMW-12A and CWM-85. This flow pattern indicates effective capture of contaminants in the deeper zone.

3.3 ONSITE GROUNDWATER QUALITY

The analytical results for the monitoring and extraction wells, and trench samples are summarized on Table 7 and Figure 9. The complete analytical report is presented in Appendix E. Samples were collected from the interceptor trench in the shallow aquifer, recovery well R-2 in the intermediate aquifer, and two recovery wells (CMW-5-11 and CMW-5-2A) in the deeper aquifer. TCE, cis-1,2-DCE, and vinyl chloride were detected at concentrations above their MCLs in deep wells CMW-5-2 and 5-2A. Cis-1,2-DCE and vinyl chloride were detected at concentrations above their MCLs in CMW-5-11. The intermediate well R-2 contained TCE, cis-1,2-DCE, and vinyl chloride above their respective MCLs.

Benzene was also detected in well R-2 at 5.3 ppb, slightly above the MCL. The trench contained only TCE above the MCL.

Consistent with previous sampling data, the presence of cis-1,2-DCE and vinyl chloride indicate the presence of natural biodegradation processes occurring in the aquifers. Furthermore, dechlorination of TCE is very evident with depth in the aquifer, based on Table 7 and Figure 9.

3.4 OFFSITE GROUNDWATER QUALITY

The second semiannual sampling results are summarized in Table 7 and Figure 9. Complete analytical results are presented in Appendix B. Offsite wells sampled during the reporting period were CMW-6, CMW-7, CMW-9, CMW-12, CMW-12-16, CMW-13, and CMW-85.

Concentrations of constituents in excess of MCLs were detected in only three offsite wells: CMW-7, CMW-9, and CMW-12. TCE and vinyl chloride were detected in wells CMW-7 and CMW-12 above their MCLs. Vinyl chloride was detected in well CMW-9 at a level slightly above the MCL. The detected values were within historic ranges (Appendix C).

3.5 TIME TRENDS

Water quality data for wells CMW-5-2, CMW-5-11, CMW-7, CMW-12, and CMW-85 were reviewed for trends (Figures 10 through 14). The historic analytical database for the site is presented in Appendix F. The concentration levels are consistent with historic data of the past few years.

The cumulative VOC mass recovered is shown on Figure 15. The trend of continuous increase clearly indicates the effectiveness of the system in removing VOCs.

3.6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Analytical results for quality assurance samples are presented in Table 8. Low levels of acetone were detected in equipment, trip, and field blank samples. Acetone has not historically been associated with the site, and the detections do not appear to be representative of the actual site conditions.

The results for CMW-7 and the duplicate sample are within acceptable limits (±20%), except for acetone, which is believed to be a laboratory artifact. 1,1-DCE is slightly above 20%; however, due to its low concentration (1.3 and 1.6 ppb), it is not believed to limit the usability of the data.

4.0 SUMMARY

4.1 TREATMENT SYSTEM

The groundwater treatment system continues to be effective at removing VOCs from the groundwater extracted from the shallow, intermediate, and deep aquifer recovery systems. Approximately 45 million gallons of impacted groundwater were removed during this period, at an average combined flow of 174 gpm. A total of 194 pounds of VOCs were removed from the shallow, intermediate and deep aquifer zones. The final RA system was started in July 1993 and updated from September 1997 through in February 1998. Since startup of the system, approximately 3,796 pounds of VOCs have been removed from the aquifer.

During the reporting period, the air stripper system operated at approximately 93% removal efficiency. The analytical results of effluent water samples collected from air stripper Outfall 001 were well within KPDES compliance limits.

The off-gases from the air stripper were treated through a catalytic oxidation system. The catalytic oxidation system removed over 99.5% of the influent gases of concern (cis-1,2-DCE, TCE, and vinyl chloride). Influent, as well as effluent, air emission analytical results were significantly less than the required EPA air emission standards for each VOC compound of concern.

4.2 GROUNDWATER FLOW

The groundwater contour maps generated for the shallow, intermediate, and deep aquifers indicate that the recovery system is effectively capturing and remediating the contaminated groundwater. In the shallow aquifer, the groundwater appears to be captured by the trench system. Historic data demonstrate capture in the intermediate aquifer. The capture zone developed in the deep zone extends beyond the leading edge of the plume in this zone beyond the Cumberland River toward well 85, nearly 2,000 feet from the site. This finding indicates that the system is not only controlling the plume's movement, but is also retracting and remediating the remaining groundwater contamination.

4.3 ANALYTICAL RESULTS

Samples collected from the groundwater recovery extraction points (Trench, R-2, CMW-5-2A and CMW-11) and in the influent water to the air stripper detected the presence of elevated concentrations of cis-1,2-DCE, TCE, and vinyl chloride. The rates of concentration decrease in the recovery and monitoring wells have slowed since the final upgraded system started up in February 1998, as is typical of these systems. However, the cumulative mass of VOCs removed is still increasing (Figure 15). The presence of the degradation products of TCE (cis-1,2-DCE and vinyl chloride) indicates that biodegradation is likely occurring in the aquifers and is actively supporting natural attenuation of the plume.

The groundwater results from the offsite wells in the deep aquifer indicate that offsite migration of contaminants is being controlled and mitigated by the remediation system. For example, the only offsite wells exhibiting constituent concentrations in excess of the MCLs were wells CMW-7, CMW-9, and CMW-12. Monitoring well CMW-85, located across the Cumberland River, was nondetect for VOCs.

4.4 QA/QC

The QA/QC samples collected during this sampling event were generally within acceptable limits. The duplicate sample collected from Well CMW-7 contained contaminant concentrations within ±20% of the original sample, except for acetone, which is believed to be a laboratory artifact. The field, equipment, and trip blank samples were free of VOCs of concern, except for acetone, a laboratory artifact that has not been detected as a contaminant at this site.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The groundwater recovery system is effectively removing contaminants from the impacted shallow, intermediate, and deep aquifers. The system also appears to be controlling the offsite migration of the contaminants and retracting the contaminant VOC plume. Water-quality data also show that natural attenuation is occurring in the aquifers.

The continued operation of the groundwater remediation treatment system along with the monthly monitoring and maintenance of the remediation system will continue to remediate the aquifers. Cooper has examined the current operation and its effectiveness on removing VOCs from the aquifers. Based on the continued success and the consistent upward trend of cumulative VOCs removed (Figure 15), Cooper does not propose any changes to the current extraction system. When a leveling off of cumulative VOCs removal is noted, Cooper will further evaluate other alternative on/off pumping schedules in an effort to continue favorable contaminant removal rates.

Influent air samples collected from the system since May 1998 have continued to be significantly below the USEPA air emission limits. This represents 12 consecutive quarters of influent air data. Based on the influent air concentrations being consistently below the limits and the continued decrease in groundwater concentrations, Cooper believes that discontinuation of the catalytic oxidation system would not affect the ability to remove contaminants or meet the objectives set forth by USEPA or KYDEP. Cooper therefore requests permission to take the catalytic oxidation system off-line.

Based on the consistency of the data, and groundwater monitoring data available since 1993, we recommend that the sampling program be reduced to annually, with corresponding annual reports to be submitted to the KYDEP and EPA.